

FIG. 1

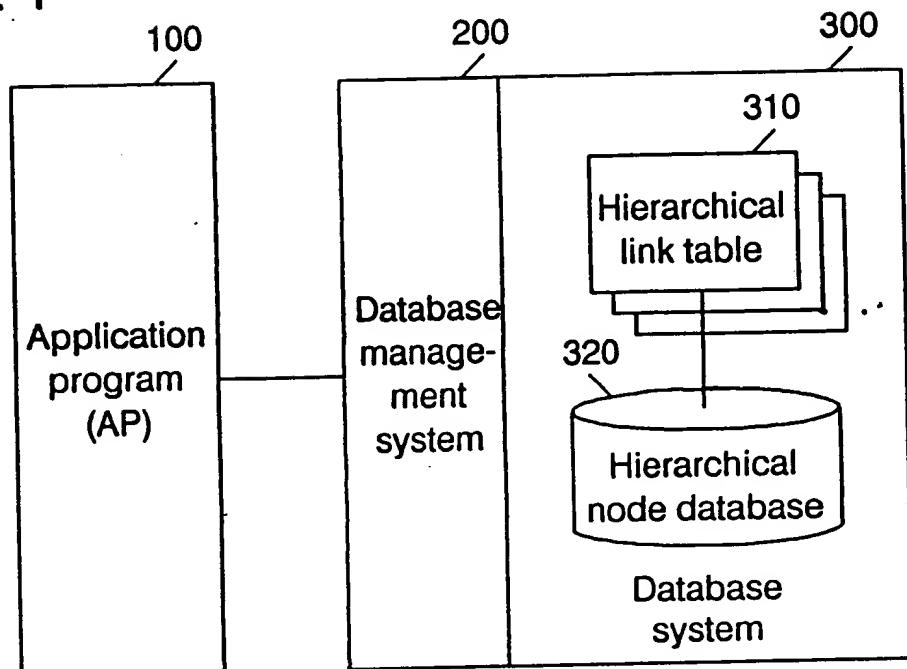


FIG. 2

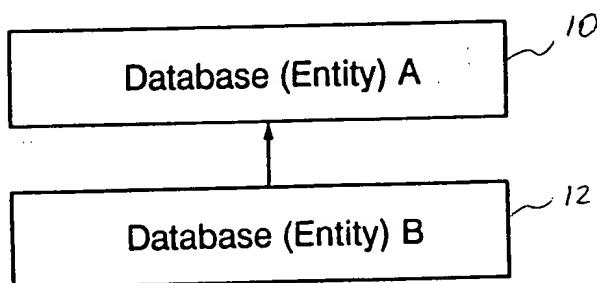


FIG. 3

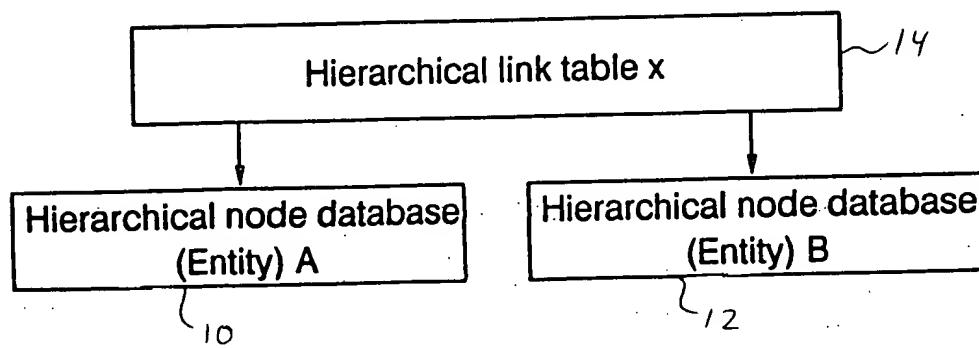
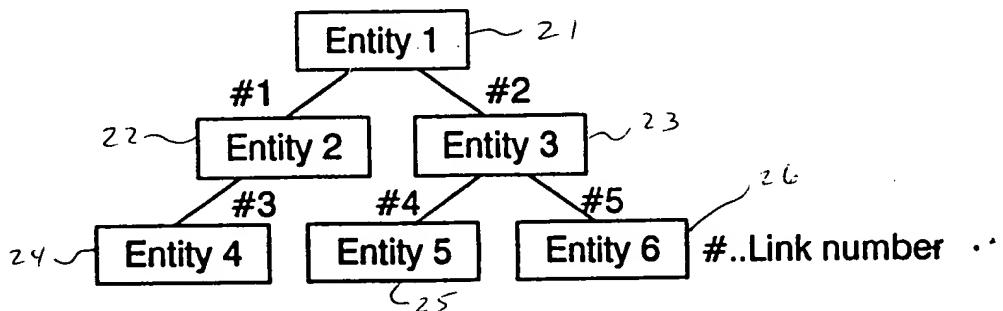
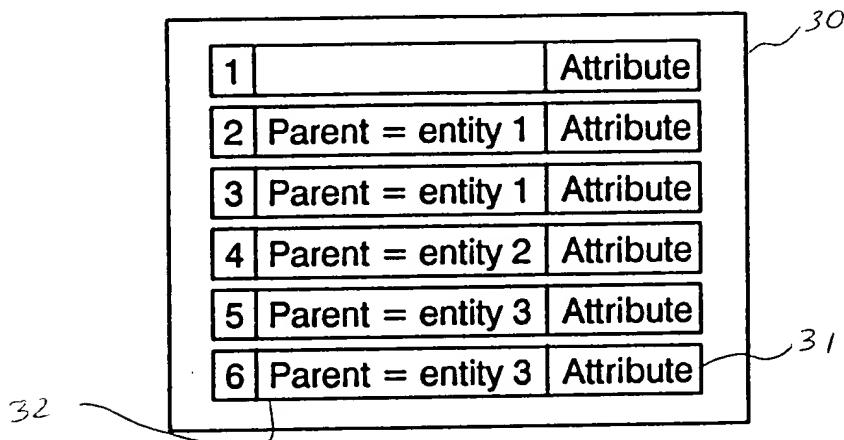


FIG. 4

Database relationship viewed from a specific application program



Conventional data storage method



Data storage method using hierarchical link table

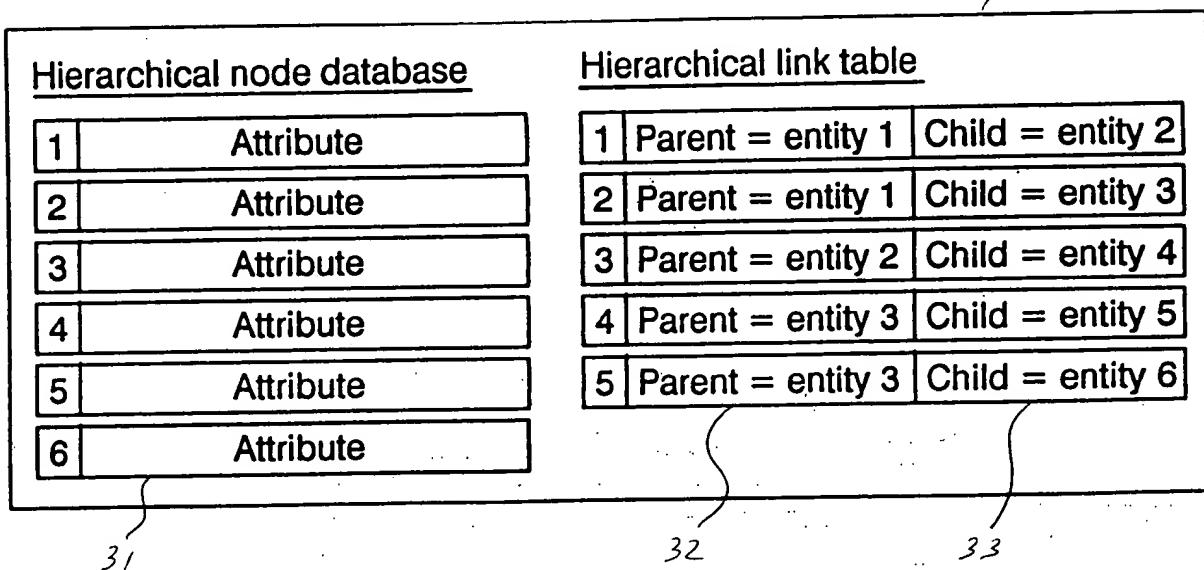
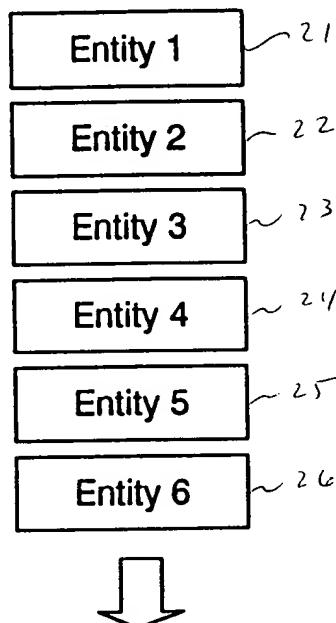


FIG. 5

Entities required for application

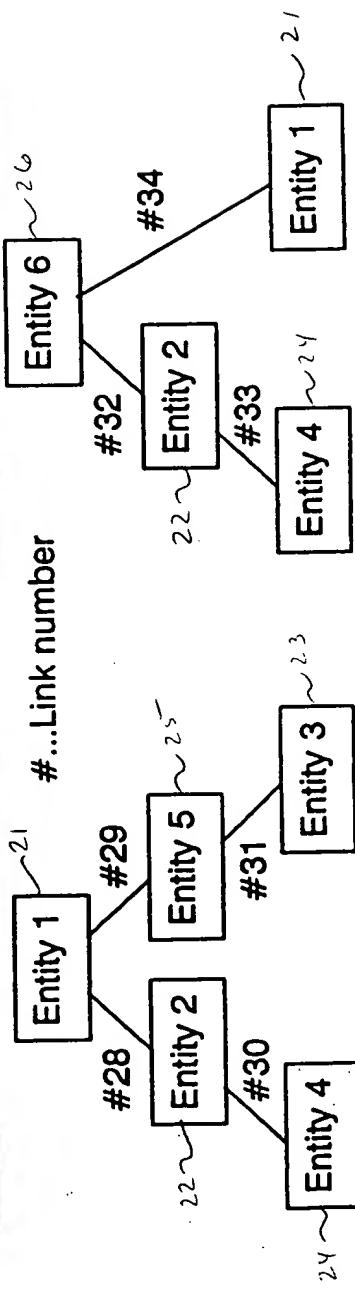


Hierarchical node database

Node ID	Node attribute
100	Entity ID = 1, Name = ....
101	Entity ID = 2, Name = ....
102	Entity ID = 3, Name = ....
103	Entity ID = 4, Name = ....
104	Entity ID = 5, Name = ....
105	Entity ID = 6, Name = ....

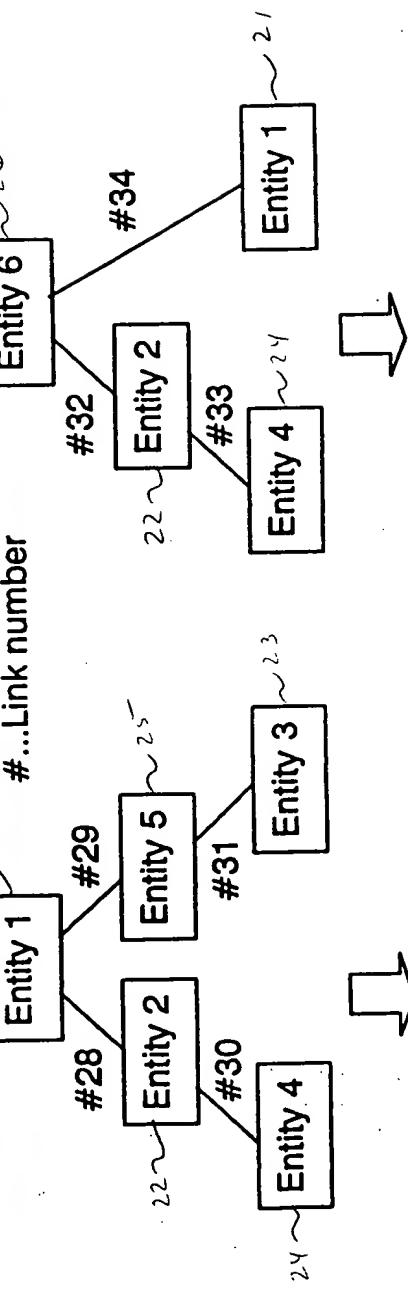
Used in common by various applications

Hierarchical structure viewed  
from application program AP1



Hierarchical structure viewed  
from application program AP2

FIG. 6



Hierarchical link table T1:  
Hierarchical structure for AP1

Link ID	Structure name/ Owner ID	Parent node	Child node
28	Application AP1	100	101
29	Application AP1	100	104
30	Application AP1	101	103
31	Application AP1	104	102

Hierarchical link table T2:  
Hierarchical structure for AP2

Link ID	Structure name/ Owner ID	Parent node	Child node
32	Application AP2	105	101
33	Application AP2	101	103
34	Application AP2	105	100
			102

Prepared in accordance with various application programs  
(Can be used in common)

FIG. 7

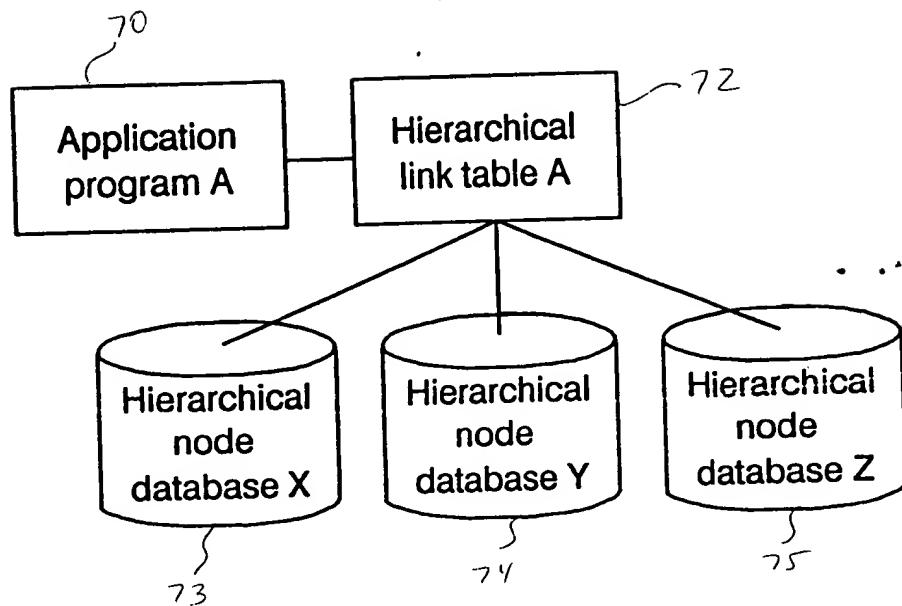
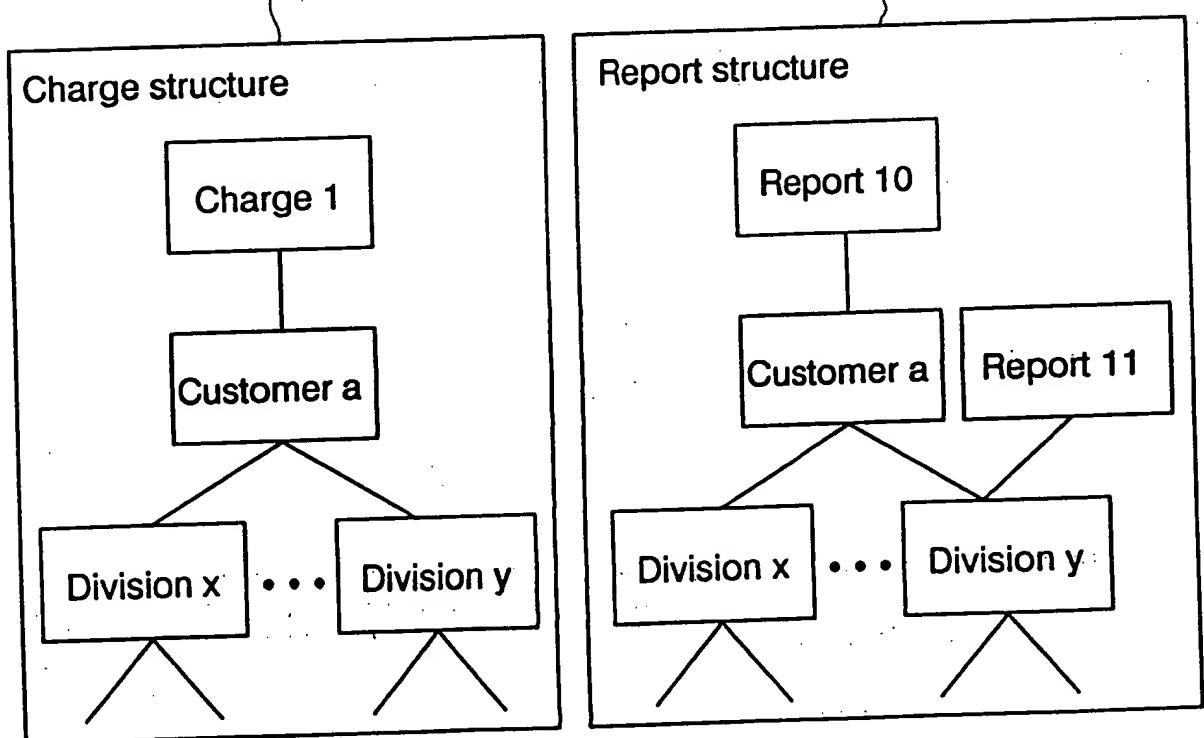


FIG. 15



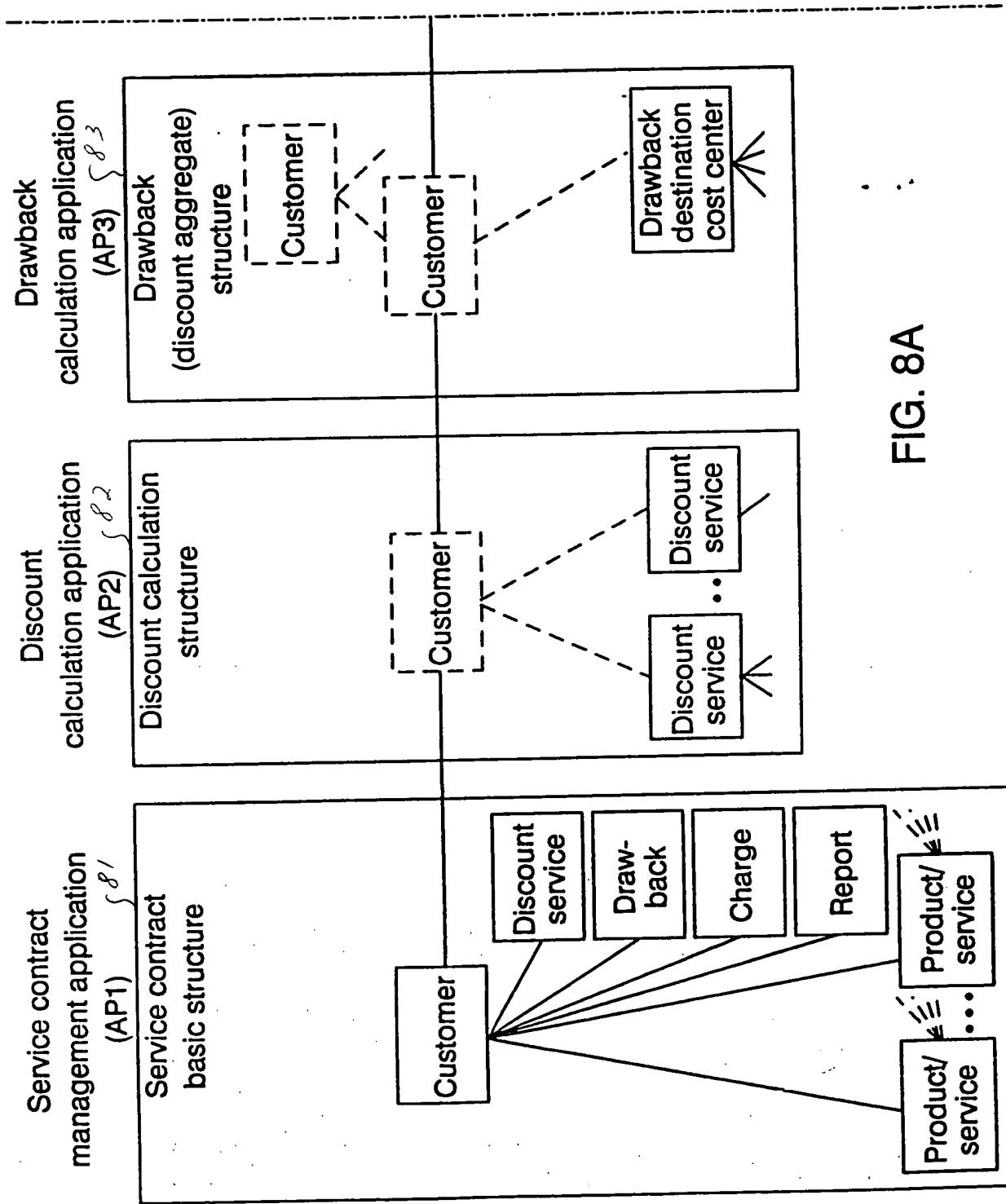


FIG. 8A

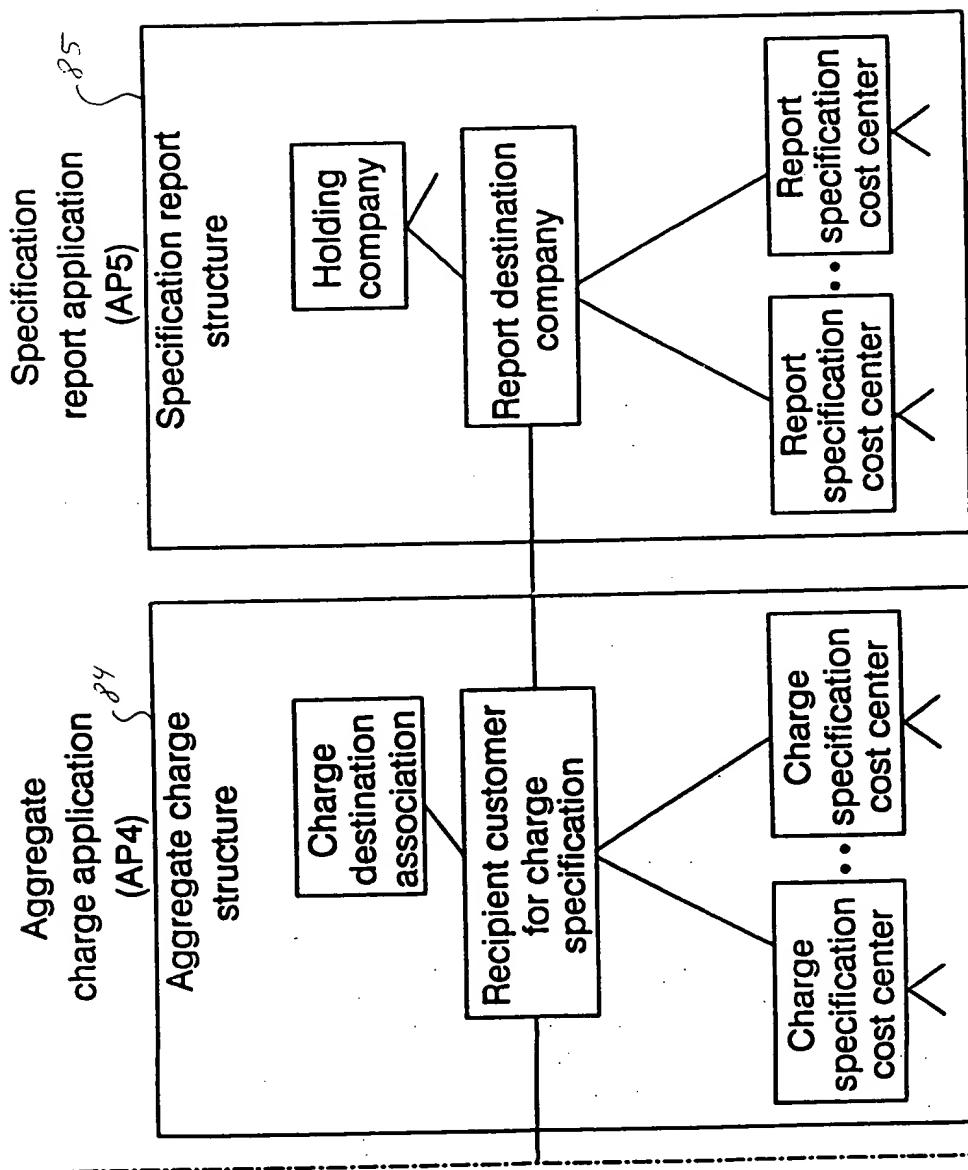
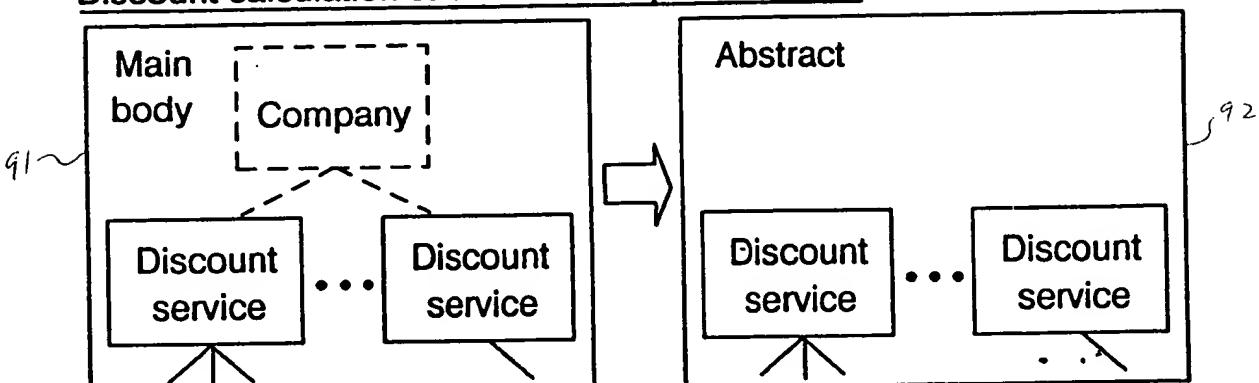


FIG. 8 [ FIG. 8A FIG. 8B ]

FIG. 8B

FIG. 9

Discount calculation structure for a specific client



Hierarchical node database: Product catalog

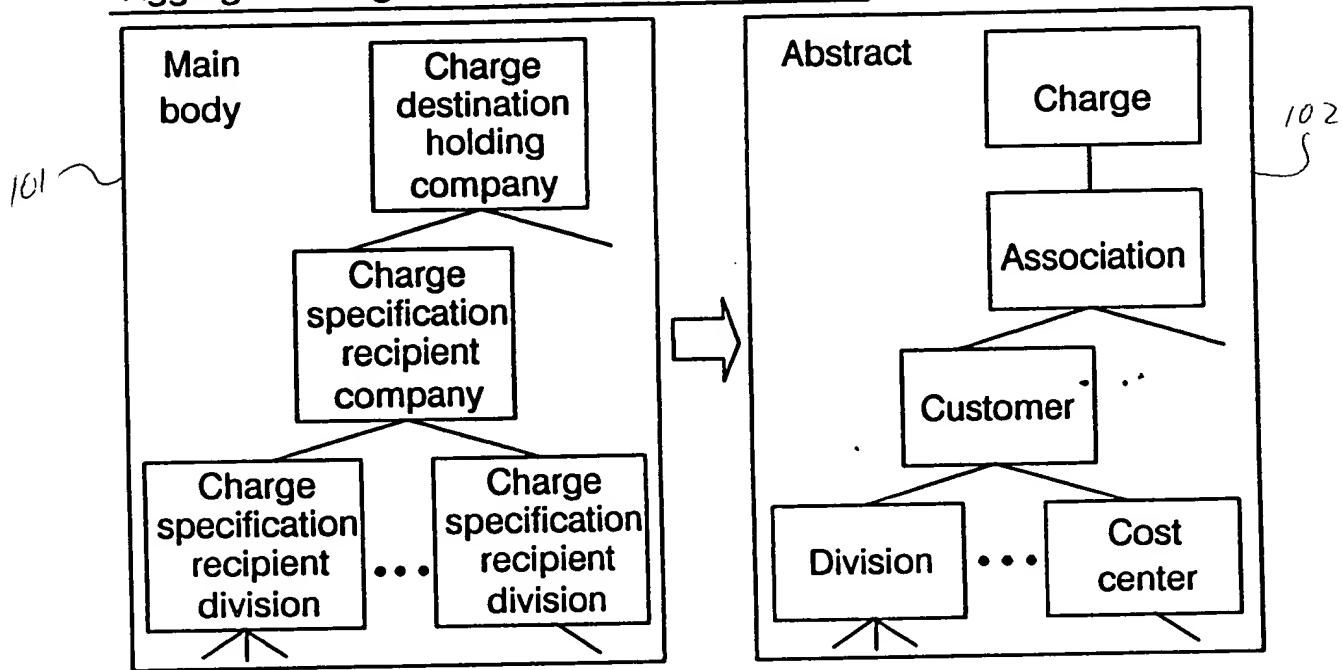
Product ID	Attribute
Product/service 1	Attribute 1
Product/service 2	Attribute 2
Product/service 3	Attribute 3
Product/service 4	Attribute 4
Charge calculation 4	Attribute 4
Discount 5	Attribute 5
Discount 6	Attribute 6

Hierarchical link table: Discount structure 1

Link ID	Owner	Parent node	Child node
Link 1	Discount structure 1	Charge calculation 4	Product/service 1
Link 2	Discount structure 1	Charge calculation 4	Product/service 2
Link 3	Discount structure 1	Charge calculation 4	Product/service 4
Link 4	Discount structure 1	Charge calculation 4	Product/service 3
Link 6	Discount structure 1	Discount 5	Product/service 1
Link 7	Discount structure 1	Discount 5	Product/service 2
Link 8	Discount structure 1	Discount 6	Product/service 1
Link 9	Discount structure 1	Discount 6	Product/service 3
Link 10	Discount structure 1	Discount 6	Product/service 4

Aggregate charge structure for a specific client

FIG. 10



Hierarchical node database:

Organization DB

Organization ID	Attribute
Association 1	Attribute 1
Customer 1	Attribute 1
Division 1	Attribute 1
Division 2	Attribute 2

Hierarchical node database:

Product catalog

Product ID	Attribute
Charge 1	Attribute 1
Product/service 1	Attribute 1
Product/service 2	Attribute 2
Product/service 3	Attribute 3
Product/service 4	Attribute 4

94

Hierarchical link table: Charge structure 1

Link ID	Owner	Parent node	Child node
Link 1	Discount structure 1	Charge 1	Association 1
Link 2	Discount structure 1	Association 1	Customer 1
Link 3	Discount structure 1	Customer 1	Cost center 1
Link 4	Discount structure 1	Customer 1	Cost center 2
Link 5	Discount structure 1	Association 1	Customer 2

FIG. 11

Example used for hierarchical link table:

Link ID	Effective start date	Effective end date	Structure name/ Owner ID	Parent node	Child node
28	1999.1.10		Application AP1	100	101
29	1999.1.10		Application AP1	100	104
30	1999.1.10	1999.3.31	Application AP1	101	103
31	1999.4.1		Application AP1	101	102

Example used for hierarchical node database:

Node ID	Effective start date	Effective end date	Node attribute
100	1999.1.1		Entity ID = 1, Name = ...
101	1999.1.1		Entity ID = 2, Name = ...
102	1999.4.1		Entity ID = 3, Name = ...
103	1999.1.1	1999.3.31	Entity ID = 4, Name = ...
104	1999.1.1		Entity ID = 5, Name = ...
105	1999.1.1		Entity ID = 6, Name = ...

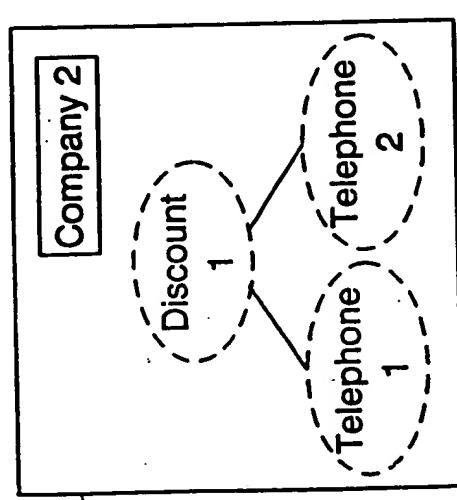
FIG. 12 FIG. 12 A FIG. 12 B

FIG. 12A

(a)  
Charge/discount calculation  
A case wherein no change  
occurs during a period

Cycle table

6/20-7/19  
Charge calculation period



(b)  
Charge/discount calculation  
A case wherein a change  
occurs during a period

On July 25th,  
discount 1 was  
changed to discount  
2 dated the 14th

Cycle table

6/20-7/13

Charge calculation period

Input 50  
change  
7/25  
Link start  
date: 7/14  
Link end  
date: 7/13

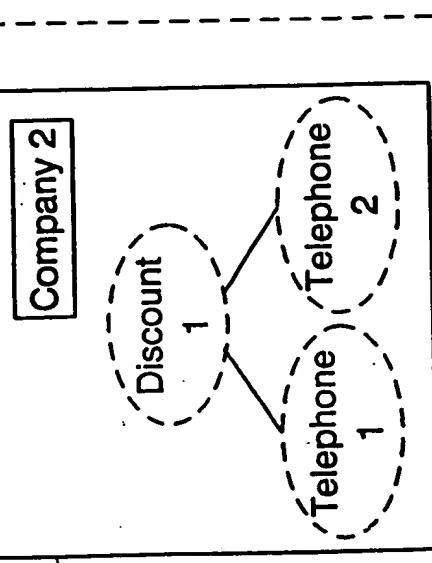
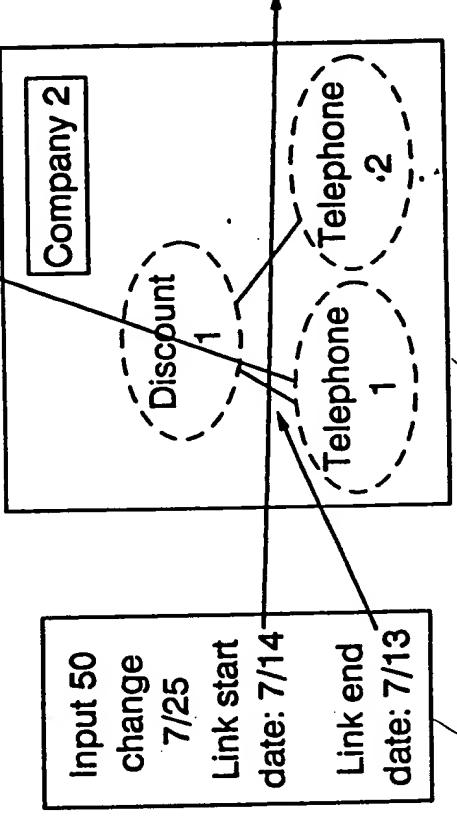


FIG. 12B

(c) Charge fee aggregate

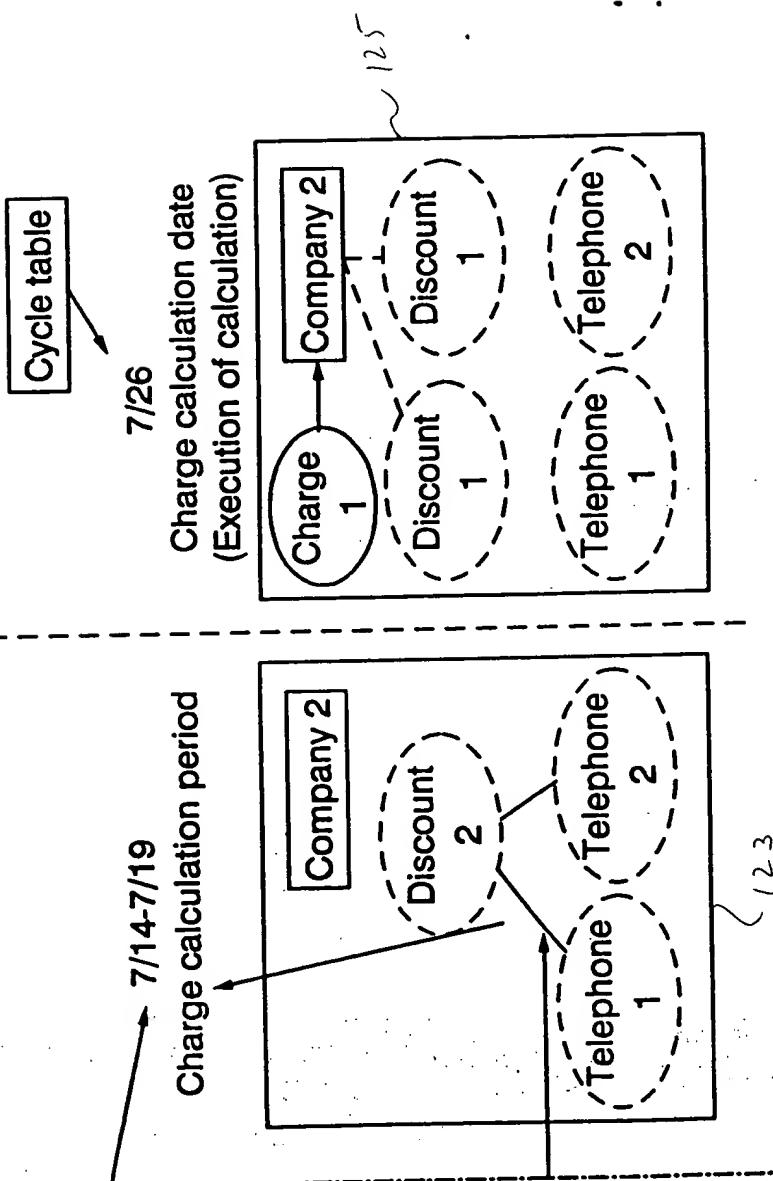


FIG. 13

131

Node ID	Effective start date	Effective end date	Node attribute
1999.1.1	1999.3.31	Type = nearest address, Telephone address ID = ...	
1999.4.1		Type = nearest address, Telephone address ID = ...	
1999.1.1	1999.3.31	Type = cable, Cable ID =, Cable name = ...	
1999.4.1		Type = cable, Cable ID =, Cable name = ...	
1999.1.1		Type = HH, HH - ID =, HH name = ...	
1999.1.1		Type = optical center line, Optical center line No =, Status = vacant	
1999.8.1		Type = ONU. ONU type =, ONU - ID = ...	
1999.8.1		Type = ONU - LC, C slot No = ...	
1999.1.1		Type = N - SLT, SLT - ID = ...	
1999.1.1		Type = OSU, OSU position = ...	
1999.1.1		Type = VCN, VCN position = ...	
1999.1.1		Type = connection terminal, Connection terminal No = ...	
1999.1.1		Type = metal center line, Center line No = ...	
1999.1.1		Type = LXM position, LXM position No = ...	
1999.1.1		Type = DSU, DSU - ID = ...	
1999.1.1		Type = connection terminal, Connection terminal No = ...	

FIG. 14A

Discount calculation  
(including charge calculation)

→ Charge/discount calculation route  
⇒ Drawback (Proportional allotment) route

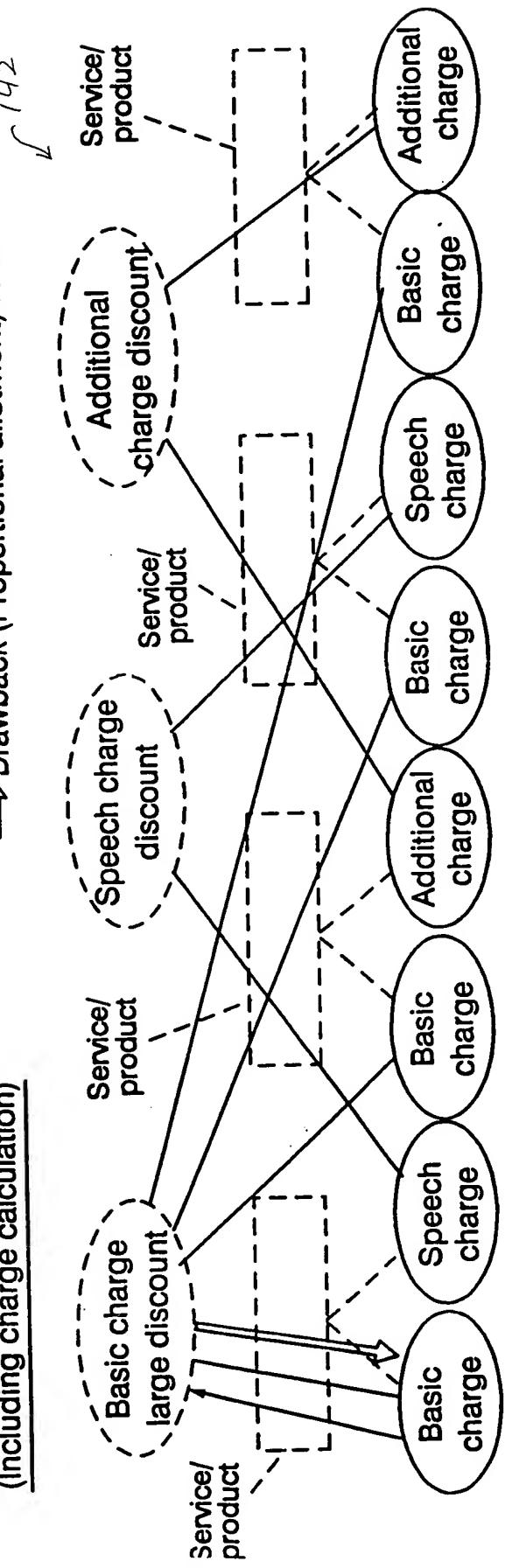


FIG. 14B

Charge aggregate:  
(Pre-discount charge  
aggregate separate from  
discount aggregate)

→ Pre-discount charge aggregate route  
↔ Discount aggregate route

